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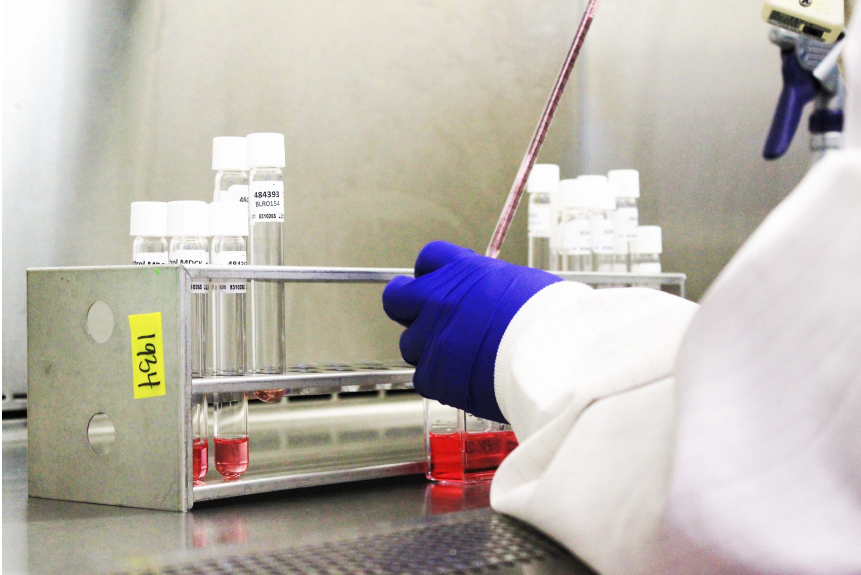
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The Science Behind the Flu Vaccine

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Throughout flu season, NHRC receives samples from military hospitals and clinics throughout Southern California and Illinois from patients with flu-like symptoms or febrile respiratory illnesses (FRI).

By Cmdr. Gary Brice, Director for Operational Infectious Diseases, Naval Health Research Center

Fever. Chills. Headaches and body aches. Getting the flu isn't fun and it can lay low even the healthiest

individual. That's why every year, starting in August, there's a call throughout the military for personnel to get their flu vaccination—it is currently the best protection against the flu.

For the military, keeping our warfighters healthy is key to maintaining operational readiness. Getting vaccinated against seasonal influenza is one simple way to protect the health of our forces and ensure they're medically and mission ready, even during flu season.

Getting your flu vaccination is a quick and simple process—developing the vaccine isn't. It's a complex and lengthy process that takes place every year, requiring the time and talents of many skilled medical professionals from Navy Medicine, other Department of Defense (DoD) agencies, academic institutions, and civilian public health organizations such as the Centers for Disease Control and Prevention (CDC) and the Food and Drug Administration (FDA).

The development of next year's influenza vaccine is actually already under way, and this is where the Naval Health Research Center (NHRC) comes in. The first step in developing the new flu vaccine is to measure the effectiveness of the current one. Throughout flu season, NHRC receives samples from military hospitals and clinics throughout Southern California and Illinois from patients with flu-like symptoms or febrile respiratory illnesses (FRI). Once the samples arrive at our lab in San Diego, our analysis begins.

The first step is testing the samples for influenza. Positive samples receive further analysis so that we can identify which strains of influenza are circulating. The influenza virus can be unpredictable and is capable of evolving and creating new strains, which is why we also conduct genetic sequencing on a subset of the samples to see how the strains are evolving. The ability of the influenza virus to change over time is why new vaccines are developed every year to ensure that it provides protection against the strains that are known to be in circulation.

After NHRC scientists identify the presence and strain of influenza virus, the team further analyzes the data to determine whether or not patients positive for flu were vaccinated. Based on that information, we can know how effective the current year's vaccine is.

Once we've completed our analysis, identifying the presence and strain of influenza virus and the effectiveness of the current vaccine, we provide weekly reports with updates on influenza cases and vaccine effectiveness to the Armed Forces Health Surveillance Branch–Global Emerging Infections System (AFHSB-GEIS). The work done at NHRC contributes to the broader, more global efforts at conducting disease surveillance to identify and combat potential outbreaks.

In early April 2009, we found two influenza A cases that were different—they didn't subtype as either of the seasonal strains. Using advanced molecular techniques, NHRC quickly determined that the two cases were radically different and they became the first identified cases of the 2009 H1N1 pandemic. This initial recognition of the pandemic strain allowed U.S. public health authorities to respond to the outbreak in a timely manner.

Annually, in February, NHRC staff presents our findings to the Vaccines and Related Biological Products Advisory Committee (VRBPAC), the FDA group that decides which influenza strains will go into the next season's vaccine. Based on the information gathered during the current flu season, scientists predict which strains will be in circulation and cause the most sickness during the next season. Because the virus is constantly changing, the new vaccine may protect against strains that weren't covered by last season's flu vaccine. And that's why it's important to get a flu vaccination every year.

Even if you were vaccinated last year, over time, your body's immune response declines. Getting your

annual flu vaccine offers the best protection against known strains of influenza to help keep you from coming down with the flu.

SIDEBAR:

Why is the influenza vaccination more effective some years and less effective in others?

When a virus changes gradually over time, known as antigenic drift, your immune system may not recognize the new strain, which is why we develop new vaccines each year. But, when the virus has an abrupt and major change, known as antigenic shift, a novel virus is created, which is something most people have little or no protection against.

An antigenic shift produces a virus not previously found in humans and is the result of animal-to-human transmission, such as swine or avian flu.

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